

What is Claimed Is:

- 1 1. A communication system comprising:
2 a plurality of high altitude communication devices;
3 a user terminal establishing a plurality of multiple dynamic links
4 corresponding respectively to said user terminal, said user terminal generating
5 multiple communication portions of a communication and transmitting the
6 multiple communication portions through said multiple dynamic links; and
7 a gateway terminal receiving the communication portions from
8 the high altitude communication device and reassembling the communication
9 portions into the communication.
- 1 2. A system as recited in claim 1, wherein said high altitude
2 communication device comprises a stratospheric platform.
- 1 3. A system as recited in claim 1, wherein said high altitude
2 communication device is selected from the group consisting of a LEO satellite,
3 a MEO satellite, or a GEO satellite.
- 1 4. A system as recited in claim 1, wherein said user terminal
2 is mobile.
- 1 5. A system as recited in claim 1, wherein said multiple
2 dynamic links are capable of having independently varying data rates.
- 1 6. A system as recited in claim 1, wherein said user terminal
2 comprises a router for routing uplink communication portions through said
3 links.

1 7. A system as recited in claim 1, wherein said router
2 receives the communication portions and arranges the communication portions
3 in a predetermined sequence.

1 8. A system as recited in claim 1, wherein said user terminal
2 comprises a multiple beam antenna capable of simultaneously generating the
3 multiple dynamic links.

1 9. A system as recited in claim 1, wherein said user terminal
2 establishes a plurality of forward links and a plurality of return links, wherein
3 said plurality of forward user links is greater than said plurality of return links.

1 10. A system as recited in claim 1, wherein said user terminal
2 comprises a hub and router circuit coupled to a digital beam former for
3 receiving multiple dynamic links.

1 11. A system as recited in claim 1, wherein said user terminal
2 comprises a TCP/IP protocol for transmitting the multiple communication
3 portions.

1 12. A user terminal for a communication system comprises:
2 a plurality of receiving elements;
3 a receiving beam forming network for forming a plurality of
4 receive beams from the plurality of elements;
5 a receiving hub and router circuit coupled to the receiving digital
6 beam forming network for assembling communication portions from the beams
7 formed in the receiving beam forming network;
8 a receiving direction control circuit coupled to the hub and router
9 circuit and the receiving digital beam forming circuit for estimating relative
10 position vectors for high altitude communication devices and the user terminal

1 13. A user terminal as recited in claim 12, further
2 comprising:

3 a plurality of transmitting elements coupled to a transmitting
4 digital beam forming network;

5 a transmitting hub and router circuit coupled to the transmitting
6 digital beam forming network for making a communication into a plurality of
7 datagrams and routing the plurality of datagrams through multiple dynamic
8 links formed by transmitting digital beam forming networks and

9 a transmitting direction control circuit coupled to said hub and
10 router circuit and to said transmitting digital beam forming network for forming
11 relative position vectors of said user terminal and high altitude device for
12 transmitting digital beam forming network directs transmitting beams at the
13 high altitude communication devices.

1 14. A user terminal as recited in claim 13, wherein said
2 transmitting direction control circuit comprises estimation algorithms for
3 generating a user state vector and a platform state vector.

1 15. A user terminal as recited in claim 14, wherein said user
2 state vector and said platform state vector are used to generate relative position
3 vectors.

1 16. A user terminal as recited in claim 13, wherein said
2 transmitting hub and router circuit comprises a routing table which is updated
3 with motion vectors from said transmitting direction control circuit.

1 17. A user terminal as recited in claim 13, wherein said
2 transmitting digital beam forming circuit comprises a demodulator.

Hub
A7

Sch
B1

1 18. A method of operating a communications system
2 comprising:
3 forming a plurality of multiple communication links directed to a
4 plurality of high altitude communication devices;
5 dividing a communication into a plurality of datagrams;
6 routing the plurality of datagrams through the plurality of
7 multiple communication links;
8 directing the datagrams from the high altitude communication
9 device to a gateway station; and
10 reassembling the datagrams into the communication.

1 19. A method as recited in claim 18, further comprising the
2 step of generating a second plurality of datagrams at a gateway station;
3 establishing a second plurality of dynamic communication links
4 between a communication station and a user terminal through a plurality of high
5 altitude communication devices;
6 reassembling the second plurality of datagrams into the
7 communication at a user terminal.

1 20. A user terminal for a communication system having a
2 plurality of high altitude communications device comprising:
3 a plurality of reconfigurable elements;
4 a beam forming circuit coupled to the plurality of reconfigurable
5 elements; and
6 a hub and router circuit coupled to the beam forming network for
7 controlling the generation of and direction of a plurality of simultaneous
8 multiple links for communication with the plurality of high altitude
9 communications devices using the plurality of elements.

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